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Factors Influencing Corn Futures Prices and Derivative Trading Strategies: A Literature Review

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Abstract. Corn is an important agricultural commodity used primarily for animal feed and industrial processing. Corn futures prices are influenced by a range of interconnected factors, including weather conditions, supply and demand fundamentals, exchange rate movements, geopolitical events, and trade policies. Although previous studies have examined these factors separately, relatively few provide an integrated review linking market fundamentals, multiple sources of risk, and related derivative trading strategies. This paper reviews the existing literature on the major factors affecting corn futures prices and discusses commonly used trading and risk management approaches. It examines global corn supply and demand, including the role of substitute grains such as wheat and sorghum. It also discusses climate and extreme weather risks, exchange rate risks, and geopolitical and policy risks, and reviews derivative strategies including weather-related option strategies, inventory-based trading, exchange-rate hedging, and cross-commodity arbitrage. The literature suggests that corn futures price movements are shaped by the interaction of fundamental, macroeconomic, weather, and policy factors rather than by a single dominant variable. The review also identifies limitations in the existing literature, particularly the reliance on historical data and the limited attention paid to trader behavior and recent market developments.

Keywords: corn futures, price drivers, weather risk, trade policy, derivative trading strategies

1. Introduction

Corn is the world's largest grain crop by output and supports a large-scale livestock industry.Because corn futures are contracts based on an underlying physical commodity, their prices are closely related to developments in corn production, inventories, consumption, and international trade. Weather conditions in major producing regions, changes in import and export policies, exchange rate movements, and geopolitical events can therefore affect both the physical corn market and corn derivative prices.

Many academic studies have investigated the driving factors behind corn futures prices, including U.S. dollar exchange-rate fluctuations, policy risks, and weather-related shocks, such as natural disasters that influence corn production [1-4]. However, few studies provide an integrated synthesis of these diverse findings.

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This paper reviews the existing literature on the major factors influencing corn futures prices and discusses related derivative trading and risk management strategies. It synthesizes evidence on corn market fundamentals, price risks, and commonly used derivative strategies, including inventory-based trading, weather-related option strategies, exchange-rate hedging, and cross-commodity arbitrage. By integrating these strands of literature, the paper provides an overview of the drivers of corn futures prices and the practical challenges associated with managing these risks.

2. Corn market

2.1. Supply

There are many corn-producing regions in the world. The world's major corn-producing regions used in the futures market are located in the Corn Belt of the United States (Iowa, Illinois, Nebraska, Minnesota, Indiana), Brazil (Mato Grosso, Mato Grosso do Sul), Argentina (the Pampas), China (Northeast China, including Heilongjiang, Jilin, and Liaoning), and Ukraine. The data from the United States Department of Agriculture Foreign Agricultural Service showed that for the 2025/2026 marketing year, 33% of global corn production was from the United States, 23% from China, 11% from Brazil, and 5% from Argentina [4]. Except for Brazil, where corn is grown twice a year, other regions typically have only one corn harvest per year. The world's corn market mostly uses yellow corn for trade, while white corn is generally not involved in international trade. OECD/FAO stated that yellow maize accounts for the majority of global maize production and is widely cultivated across the Northern Hemisphere, where it is primarily used as animal feed. In contrast, white maize is mainly produced for human consumption in regions such as Latin America, southern Africa, and South Asia, where it is grown under a wide range of climatic conditions [5].

2.2. Demand

The primary functions of corn are as animal feed and for ethanol production. The majority of countries import corn primarily for animal feed.

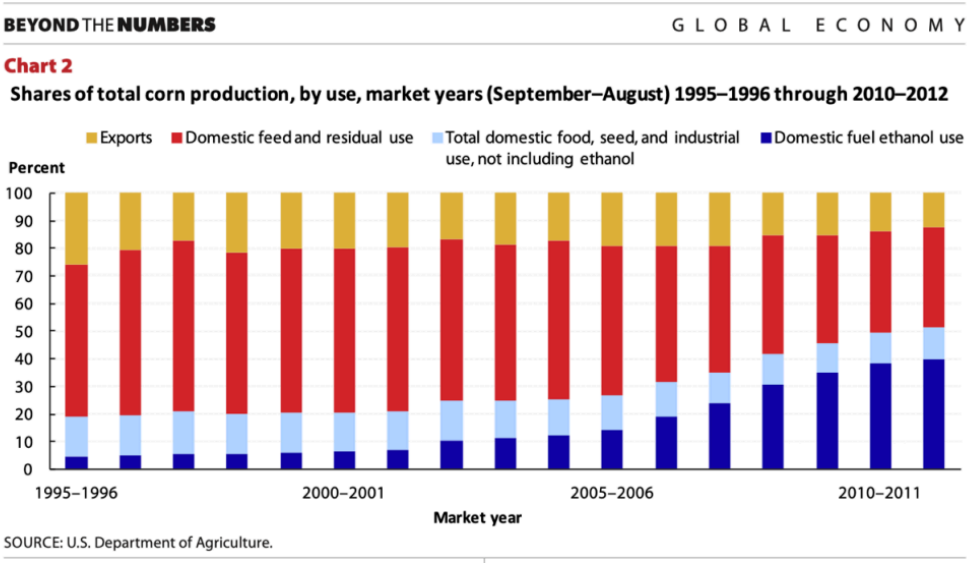


Figure 1. Shares of total corn production, by use, market years (September–August) 1995-1996 through 2010-2012 [6]

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Figure 1 shows the percentage of total corn production by use for the marketing years 1995-1996 to 2010-2012 (September to August of the following year). The percentage of corn used domestically in the United States for ethanol production steadily increased from less than 5% to around 30%, while the percentage used for export and domestic animal feed decreased.

2.3. Alternatives

When global corn production declines, the main substitutes are wheat and sorghum, as they can be used both as poultry feed and for ethanol production. The prices of wheat and sorghum will influence the price of corn. According to the U.S. Department of Agriculture, Economic Research Service, urbanization, income growth, and population expansion will lead to a significant increase in demand for chicken [7]. Corn and wheat prices will be particularly affected, as they are commonly used grains in broiler feed formulations. The emergence of new tannin-free sorghum varieties enhances their ability to substitute for corn in livestock feed. When sorghum prices are lower than corn prices and global corn price risks are high (e.g., after the Russia–Ukraine war), risk-averse producers will switch to planting sorghum [7]. The study indicates that there is a high substitution rate between sorghum and corn.

3. Risks

3.1. Climate and extreme weather risks

Corn is sensitive to high temperatures, drought, and excessive rainfall. First, sustained high temperatures or drought can cause corn pollination failure, leading to a significant reduction in yield. After corn silking and pollination, drought can also affect corn during the grain-filling stage, resulting in small corn kernels and reduced yield. Second, excessive rainfall and waterlogged conditions can cause oxygen deficiency in corn roots, leading to root rot. Third, early frost (the early occurrence of frost at 0°C or below) can stop nutrient accumulation in corn before it is fully mature, leading to a decrease in yield. Makkonen et al. find that temperature anomalies have a significant negative (positive) impact on soybean, corn, cotton, and coffee (soybean, corn, and cocoa) futures returns under extreme bearish ($\tau = 0.05$) and bullish ($\tau = 0.95$) market conditions, suggesting that investors value temperature anomaly information, particularly under extreme market conditions [3]. For example, in mid-September 2009, forecasts indicated that cold air from Canada would move southward, potentially causing severe frost in the north-central and central-western United States. This information led to a significant increase in corn futures prices. The looming threat of frost pushed CBOT corn futures higher on Tuesday, prompting funds to cover short positions and driving the market significantly higher. December corn futures rose 28 3/4 cents to settle at $3.46 1/2 per bushel (+9%). Extreme weather events such as strong winds and typhoons typically lead to large-scale reductions in corn yields. For example, three consecutive typhoons occurred in Northeast China in 2020, which prevented agricultural machinery from harvesting, significantly increasing harvesting costs, while high grain moisture content led to higher drying costs. According to Zhao et al., in 2020, 1.15–2.8 million tons of autumn grain losses were caused by northward-moving typhoons, accounting for 1.0%-2.4% of the total autumn grain output in the three northeastern provinces. Jilin Province's losses were 951,000-2.215 million tons of autumn grain, while Heilongjiang Province's losses were 136,000-517,000 tons [8].

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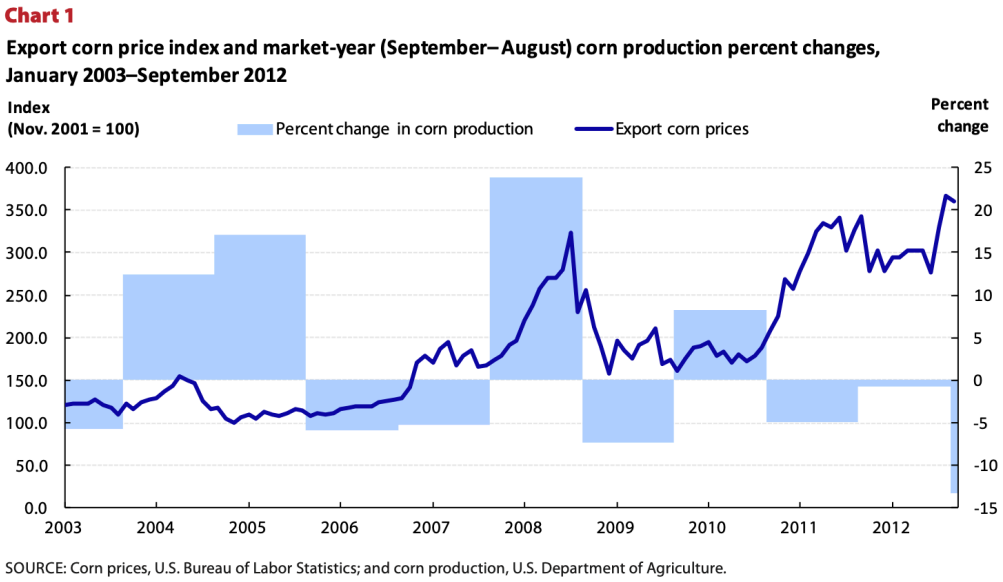


Figure 2. Export corn price index and market-year (September–August) corn production percentage changes, January 2003-September 2012

Figure 2 shows the export corn price index and the percentage change in corn production during the marketing year (September to August of the following year) from January 2003 to September 2012. Prior to 2011, higher corn production was correlated with lower export prices the following year. However, the United States experienced a drought in 2010. Even though the drought primarily affected corn production in 2012, corn prices remained high from 2011 onward, and subsequent low yields further increased prices [6].

3.2. Exchange rate risks

Corn futures are priced in U.S. dollars. Fluctuations in the U.S. dollar exchange rate will cause changes in futures prices relative to buyers and sellers, which will affect corn exports. An appreciation of the U.S. dollar makes corn more expensive for non-U.S. buyers when measured in their own currency, leading to decreased import demand. Consequently, U.S. corn exports decrease, putting downward pressure on futures prices. Ba et al. show that under long-run cointegration, the dollar index significantly affects international grain futures prices, and this effect increases with grain financialization. They also find asymmetric volatility in food futures and spot prices, a negative relationship between the dollar index and grain futures prices, and interaction between futures and spot markets [1]. For example, in 2014, the Federal Reserve stopped its Quantitative Easing (QE) program, and the U.S. dollar index continued to appreciate. The U.S. Dollar Index (DXY) rose from around 80 and broke through 100. USDA data showed that U.S. corn exports declined by nearly 30% year-on-year; overseas buyers turned to corn from Brazil and Argentina in South America. Heerman notes that the U.S. exchange rate had appreciated and that global economic and political conditions suggested a continuation of this trend [9]. For U.S. exporters, a stronger dollar leads to fewer overseas orders; for futures speculators, the dollar cycle provides macroeconomic trading signals, but relying solely on the dollar index for one-sided corn trading remains highly risky; for farmers in Brazil and Argentina, a depreciation of their local currency against the U.S. dollar will prompt them to sell corn for dollars and then convert them back into

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their local currency, increasing their local currency income and stimulating their willingness to plant and export agricultural products.

3.3. Geopolitical and policy risks

Policy risk is a common risk for crops. International trade is often subject to various incentive or restrictive policies, which affect both the quantity and price of corn exports. A ban declaration can also affect traders in the derivative market. Adjemian et al. argue that implied volatilities, and thus commodity option prices, rise significantly after an export ban is announced. This implies that before the ban, derivative market participants with advance knowledge of the government's intention would have strong incentives to trade [2]. Geopolitical risks can affect corn-producing regions, directly affecting corn exports. War is a form of geopolitical risk and also the risk that most directly affects corn. Mamonova et al. note that although corn had been a "cash cow" for Ukrainian agribusiness over the previous decade, it became a major burden in the first months of the war, as destroyed infrastructure and storage facilities and the Black Sea naval blockade led to a domestic corn glut, serious storage problems, crop damage, and an oversupply of corn seeds [10]. In this case, the corn market has to shift its corn sources to other countries. The risk affected not only Ukraine but also derivatives traders and various countries.

4. Trading strategies

4.1. Supply and demand-based inventory trading strategies

USDA reports provide information on corn production and usage in various countries, which is suitable for traders to analyze the medium- to long-term trend of corn prices. Traders can analyze the basic trend of corn prices and take long or short positions in futures.

4.2. Seasonal trading strategy based on climate and weather

Trading based on climate and weather can be divided into two parts: before or during weather problems. There are higher risks in the corn market when weather is abnormal. These risks stem from traders' uncertainty about whether weather changes or extreme weather will actually affect corn yields, and how much impact they will have.

4.2.1. Before the weather changes

Before many traders notice weather changes, there will be a short window for a straddle. A straddle allows traders to buy a call option and a put option of equal quantities with the same futures contract, same expiry date, and same strike price. If the corn market experiences significant volatility, traders can profit by exercising some of their options. For example, suppose the current corn futures price and the strike price are both $4.80 per bushel. A trader purchases a call and a put option with the same strike price and expiration date, paying a premium of $0.15 per option, or $0.30 in total. If the futures price rises to $5.40 at expiration, the call option has an intrinsic value of $0.60 per bushel, while the put expires out of the money. Ignoring transaction costs and other considerations, the net payoff is approximately $0.30 per bushel ($0.60 - $0.30). If the futures price does not move sufficiently to offset the total option premium, the strategy may result in a loss.

Significant weather changes can cause market volatility, from which traders can profit. However, traders need to time their trades. If the market has already begun to fluctuate, the premiums for

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options will go up, and the volatility will not provide the same returns as before. In fact, traders may even incur losses due to excessively high premiums and transaction fees.

4.2.2. In the midst of weather problems

During weather-related events, traders need to closely monitor both bullish and bearish information. When persistent high temperatures and drought occur during critical growing seasons, typhoon forecasts are issued, frost risks are present, and the expected damage exceeds market consensus, traders can establish long positions. When the drought improves, the disaster subsides rapidly, and the yield outlook is better than expected, traders can establish short positions.

4.3. Exchange rate-based hedging strategies

A stronger U.S. dollar makes U.S. corn exports more expensive, prompting buyers to turn to corn from other countries, leading to a decline in U.S. exports and putting downward pressure on CBOT prices. Therefore, corn derivatives can be used to hedge against the risk of changes in the U.S. dollar exchange rate. Traders can establish long positions in corn if they hold U.S. dollars and expect the U.S. dollar to decline. However, in most cases, traders can directly hedge against the risk of U.S. dollar exchange rate fluctuations by purchasing U.S. dollar derivatives.

4.4. Cross-commodity arbitrage

Trading the price ratio or spread between two related commodity futures by taking long and short positions can reduce some of the risk caused by overall market price fluctuations and allow traders to benefit from price reversion. In the corn market, traders can use corn-soybean futures spreads to trade on changes in the relative prices of the two commodities. Changes in the corn-soybean price ratio can affect farmers' planting decisions because corn and soybeans compete for acreage in some regions. When corn prices are relatively high compared with soybean prices, farmers may plant more corn, which can increase future corn supply and reduce soybean acreage. These changes in planting decisions may then affect the prices of corn and soybeans. Therefore, traders can use corn-soybean spread positions to take advantage of changes in the price difference between the two commodities.

5. Conclusion

This article explores the supply-demand relationship of corn, production drivers, and derivative trading strategies. Global corn supply is significantly influenced by seasonal factors, while demand for feed and ethanol dominates, with wheat and sorghum serving as substitutes. Extreme weather, exchange rate fluctuations, and trade and agricultural policies all have a substantial impact on corn production and prices. Straddle options and corn-soybean arbitrage can help traders profit and hedge against risks. To cope with market uncertainty, investors need to combine fundamental analysis with derivative strategies.

Despite the insights synthesized in this literature review, several important limitations should be acknowledged. First, many reviewed empirical studies rely on historical market data from around the first half of the 2010s. Second, this article focuses only on corn and includes little content on other crops. Third, this article provides only a brief summary of some trading strategies for corn derivatives, without examining the micro-behavior of traders in the derivatives market. Based on the

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limitations outlined above, several directions for future research can be identified. Future research could focus on more recent data and examine other crops in the agricultural market.

References

[1] Ba, X., Wang, X., & Zhong, Y. (2025). The impact of Federal Reserve monetary policy on commodity prices: Evidence from the U.S. dollar index and international grain futures and spot markets. *Agriculture, 15*(9), 923.
[2] Adjemian, M. K., Petroff, C., & Robe, M. A. (2026). The political economy of export bans and commodity price volatility: Theory and evidence from agricultural markets. *Journal of International Money and Finance, 164*, 103552.
[3] Makkonen, A., Vallström, D., Uddin, G. S., Rahman, M. L., & Haddad, M. F. C. (2021). The effect of temperature anomaly and macroeconomic fundamentals on agricultural commodity futures returns. *Energy Economics, 100*, 105377.
[4] U.S. Department of Agriculture, Foreign Agricultural Service. (n.d.). Production—Corn. https://www.fas.usda.gov/data/production/commodity/0440000
[5] Organisation for Economic Co-operation and Development. (2020). *OECD-FAO agricultural outlook 2020–2029*. OECD Publishing.
[6] Adonzio, W., & Royales, S. (2012). Impact of the drought on corn exports: Paying the price.
[7] Johnson, M. E., Williams, A., Valdes, C., Ajewole, K., & Beckman, J. (2025). Demand for alternative feed grains for broiler production in an era of global price uncertainty: The case of sorghum.
[8] Zhao, X., Wang, C., Cheng, L., & Qian, Y. (2025). Characteristics of agricultural impacts and yield loss estimation of northward-moving typhoons in Northeast China in 2020. *Journal of Marine Meteorology, 45*(1), 69–78. https://doi.org/10.19513/j.cnki.hyqxxb.20220825001
[9] Heerman, K. (2015). What does exchange rate appreciation mean for export competitiveness? *Amber Waves: The Economics of Food, Farming, Natural Resources, and Rural America*, (5).
[10] Mamonova, N., Wengle, S., & Dankevych, V. (2023). Queen of the fields in wartime: What can Ukrainian corn tell us about the resilience of the global food system? *The Journal of Peasant Studies, 50*(7), 2513–2538.